2004 Arkansas Energy Code for New Building Construction

Supplements and Amendments to the 2003 International Energy Conservation Code

Arkansas Energy Office
Arkansas Department of Economic Development
One Capitol Mall
Little Rock, AR 72201
(501) 682-1370
www.1800arkansas.com/energy/

Effective October 1, 2004

DRAFT

FORWARD

The Arkansas General Assembly authorized the Arkansas Energy Office to promulgate these regulations in Section 3(B)(2)(c) of Act 7 of 1981. These rules and regulations, in adherence with the Administrative Procedures Act, are effective October 1, 2004.

The Arkansas Energy Code adopts by reference the International Energy Conservation Code (IECC), 2003 Edition, published and copyrighted by the International Codes Council and the Southern Building Code Congress International, Inc. When the IECC 2003 Edition is used in conjunction with the Arkansas Supplements and Amendments, this shall constitute the official *2004 Arkansas Energy Code for New Building Construction.* For commercial structures, the International Energy Conservation Code adopts by reference the *American Society of Heating, Refrigerating, and Air Conditioning Engineers* (ASHRAE) *ANSI / ASHRAE /IESNA Standard 90.1-2001—Energy Standard for Buildings Except Low-Rise Residential Buildings.*

Questions, inquiries or request for copies of the 2004 Arkansas Energy Code Supplements and Amendments may be addressed to:

Arkansas Energy Office
Attn: *2004 Arkansas Energy Code for New Building Construction*
One State Capitol Mall
Little Rock, AR 72201
Phone: 800-558-2633
Fax: 501-682-2703
Email: energy@1-800-ARKANSAS.com
or download the information at: www.1800arkansas.com/energy/energycode

To order copies of the International Energy Conservation Code, 2003 Edition with Arkansas Supplements and Amendments contact:

International Code Council
900 Montclair Road
Birmingham, Alabama 35213-1206
Phone: 888-447-2224, Fax: 205-591-0775
Telecommunications Device for the Deaf: 205-599-9742

The *American Society of Heating, Refrigerating, and Air-Conditioning Engineers ANSI/ASHRAE/IESNA Standard 90.1-2001* is available for viewing only, without charge, on the ASHRAE website: http://www.ashrae.org/template/AssetDetail/assetid/16730.

To order copies of *American Society of Heating, Refrigerating, and Air-Conditioning Engineers ANSI/ASHRAE/IESNA Standard 90.1-2001* contact:

American Society of Heating, Refrigeration and Air-Conditioning Engineers, Inc.
1791 Tullie Circle, N.E.
Atlanta, GA 30329
Phone: 404-636-8400, Fax: 404-321-5478
Web: www.ashrae.org

OVERVIEW

This document supplements and amends the *International Energy Conservation Code (IECC), 2003 Edition*. In cases where there are differences between these "Supplements and Amendments" and the IECC 2003 Edition, or with *ANSI/ASHRAE/IESNA Standard 90.1-2001*, these "Supplements and Amendments" shall take precedence.

Each Chapter of this document associates directly with the corresponding chapters of the IECC 2003.

- **Chapter 1**: **Administration**. Amended to integrate Arkansas-specific exceptions, exemptions, enforcement, compliance and effective date.
- **Chapter 2**: **Definitions**.
- **Chapter 3**: **Design Conditions**. Establishes the design criteria for the entire state of Arkansas and defines Arkansas' four climate zones. The climate zones establish the design conditions for use with chapters 4, 5, 6 and 8.

  This chapter has been modified to include a map of Arkansas with a list of counties and their associated climate zones, and a table identifying the Heating Degree Day (HDD) ranges associated with each zone.
- **Chapter 4**: Pertains to **residential building design by systems analysis**, as well as the use of renewable resources such as wind, solar, geothermal, etc.

  Section 402.2.3.1.3 has been deleted which required windows to have a 0.40 Solar Heat Gain Coefficient (SHGC) in homes located in areas experiencing less than 3,500 HDD.
- **Chapter 5**: **Residential compliance by designed component[1] performance**—this analyzes the total building for compliance one component at a time. Assuming each individual component of the building meets the thermal requirements of the code then the entire building is deemed to comply. This chapter offers the use of "trade-offs" to achieve compliance by allowing the builder to substitute or "trade-off" values between building components. A properly executed use of an Arkansas Energy Office approved compliance tool may be used to validate any trade-off.

  Section 502.1.5 has been deleted which required the 0.40 SHGC. The *R*-values in the Minimum Duct Insulation **Table 503.3.3.3** have been changed. Also **footnote "b"** under that same table has been deleted which stated that insulation on return ducts located in a basement is not required. All references to the *International Mechanical Code* have been changed to the *Arkansas Mechanical Code*.
- **Chapter 6**: Offers **residential prescriptive compliance** via the single step compliance method by selecting an option directly from the charts in the applicable climate zone. The values from the option show the minimum requirements for each component of a residential structure for the specific climate zone. An approved Arkansas Energy Office prescripive compliance tool may be used to validate code compliance.

  Section 602.2 has been deleted which required the 0.40 SHGC.
- **Chapter 7**: Pertains to **building design for commercial buildings**, except those that comply with Chapter 8. *ANSI/ASHRAE/1ESNA Standard 90.1-2001* is adopted by reference. An approved Arkansas Energy Office compliance tool may be used to validate compliance.
- **Chapter 8**: Pertains to design by **acceptable practice for commercial buildings**. All references to the *International Mechanical Code* have been changed to the *Arkansas Mechanical Code*. An approved Arkansas Energy Office compliance tool may be used to validate compliance.

[1] The word "component" for the purposes of this code is defined as being a particular segment of a building such as a wall, ceiling, or floor. Hence, the terms *wall component* or *ceiling component*.

SUMMARY

In summary, Chapters 4, 5 and 6 offer different methods to achieve code compliance for low-rise residential construction, and Chapters 7 and 8 offer different methods to achieve code compliance for commercial and high-rise residential construction.

These amendments have four significant changes:

1) Chapter 1 was amended to integrate Arkansas-specific exceptions, exemptions, enforcement, compliance and effective date.
2) The requirement of a 0.4 Solar Heat Gain Coefficient in Chapters 4, 5 and 6 was deleted.
3) The residential duct insulation requirement was changed.
4) *ANSI/ASHRAE/IESNA 90.1-2001* is referenced for commercial buildings and high-rise residential buildings in Chapters 7 and 8.

ARKANSAS STATE AMENDMENTS

** Revise the 2004 Arkansas Energy Code for New Building Construction (the 2003 Edition of the International Energy Conservation Code), as follows:*

CHAPTER 1
ADMINISTRATION

* Amend Section 101.1 TITLE as follows:

101.1 Title. These regulations shall be known as the *2004 Arkansas Energy Code for New Building Construction*, and shall be cited as such. It is referred to herein as "this code."

101.2 Scope. Delete Exception.

* Revise Section 101.2.1 EXEMPT BUILDINGS as follows:

> **101.2.1 Exempt buildings.** Buildings and structures indicated in Sections 101.2.1.1 through 101.2.1.5 shall be exempt from the building envelope provisions of this code, but shall comply with the provisions for building, mechanical, service water heating and lighting systems.

* Add Sections 101.2.1.3, 101.2.1.4 and 101.2.1 5 as follows:

> **101.2.1.3:** Buildings and structures or portions thereof that are exclusively heated or cooled by renewable fuels.
>
> **101.2.1.4:** Mobile homes
>
> **101.2.1.5:** Temporary use structures such as hunting and fishing camps, boat houses, remote cabins, etc. that do not meet the definition of "dwelling units" in Section 202; General Definitions.

* Delete Section 101.2.2.2 ADDITIONS, ALTERATIONS OR REPAIRS and replace with the following:

101.2.2.2 Additions to Existing Buildings: Additions to existing buildings or structures may be made to such buildings or structures without making the entire building or structure comply. The new addition shall conform to the provisions of this Code as they relate to new construction only.

* Delete Section 101.2.2.3 HISTORIC BUILDINGS and replace with the following:

101.2.2.3 Renovations: Any rehabilitation of an existing building that requires more than 25 percent of the gross floor area or volume of the entire building to be rebuilt shall comply with this Code. Cosmetic work such as painting, wall covering, wall paneling, and floor covering shall not be included.

* Delete Section 101.2.2.4 CHANGE IN OCCUPANCY and replace with the following:

101.2.2.4 Historic buildings. The provisions of this code relating to the construction, alteration, repair, enlargement, restoration, relocation or movement of buildings or structures shall not be mandatory for existing buildings or structures specifically identified and classified as historically significant by the state or local jurisdiction, listed in *The National Register of Historic Places* or which have been determined to be eligible for such listing.

SECTION 103
ALTERNATE MATERIALS—METHOD OF CONSTRUCTION, DESIGN OR INSULATING SYSTEMS

* Revise paragraph two of Section 103.1 GENERAL as follows:

Compliance with specific provisions of this code may be determined through the use of deemed to comply computer software, worksheets, compliance manuals and other similar materials when they have been approved by the Arkansas Energy Office.

SECTION 104
CONSTRUCTION DOCUMENTS

* Add Section 104.3 DESIGN PROFESSIONAL as follows:

104.3 Design Professional: Architects and engineers employed to prepare plans and specifications for new buildings shall ensure the plans and specifications comply with the provisions of this Code in a manner consistent with their obligations under Arkansas State law (see also the *Arkansas Fire Prevention Code 2002 Edition*, Volume I Fire, Volume II Building).

* Delete Section 105 INSPECTIONS and substitute the following:

SECTION 105
CONTRACTOR / BUILDER COMPLIANCE

105.1 General: Compliance with this Code shall be the obligation of the licensed builder or contractor.

105.1.1 Compliance: Compliance signifies that the licensed builder or contractor has constructed or will construct or renovate the building in compliance with the requirements of this Code, and that by inspection within a two-year period from the date of completion, if the building fails to meet the Code's specifications, understands that he or she is responsible for bringing the building into compliance with this Code.

105.1.2 Compliance Materials: Compliance materials, instructions and Arkansas Energy Office approved tools and third-party services, are made a part of this Code by reference.

105.1.3 Compliance by Self-Builders: Compliance with this Code by builders who build, or contract to build, single-family buildings for their own occupancy is voluntary.

105.2 Compliance Alternatives

105.2.1 Alternative Compliance Tools Arkansas Energy Office approved alternative compliance tools may be used to validate code compliance.

105.2.2 Federally Financed Homes: Newly constructed single and multi-family buildings financed through FHA, VA, and FmHA programs shall meet the thermal performance requirements of this Code.

* Delete Section 106 VALIDITY and substitute the following:

SECTION 106
INSPECTIONS

106.1 General. Construction or work that must comply with this code shall be subject to inspection by the Arkansas Energy Office or its agent, or by the code official if a county or municipality elects to adopt this Code.

106.2 Approvals required. If a county or municipality elects to adopt this Code then no work shall be done on any part of the building or structure beyond the point indicated in each successive inspection without first obtaining the written approval of the code official. No construction shall be concealed without inspection approval from the code official.

106.3 Final inspection. Code officials within a county or municipality who have adopted this code shall perform a final inspection and approval for buildings when completed and ready for occupancy.

106.4 Reinspection. The Arkansas Energy Office or its agent or code official may cause a structure to be reinspected.

* Delete Section 107 REFERENCE STANDARDS and substitute the following:

SECTION 107
ENFORCEMENT

107.1 General: Enforcement of this Code shall be the responsibility of the Arkansas Energy Office or local government (if adopted).

107.2 Local Government: Any county or municipality may elect to adopt this Code for new construction, additions and renovation of existing structures. However, the local municipality shall not in any way modify the energy conservation standards in this Code or promulgate or adopt rules or regulations that are less stringent than this Code.

A local government may exercise other administrative and enforcement procedures that it deems necessary to affect the purposes of this Code, including, but not limited to, prior plan approval, building permit requirements, and inspections during the course of construction.

* Add Section 108 APPEALS as follows:

SECTION 108
APPEALS

108.1 Board of Appeals: Any appeal of the energy conservation standards contained in this Code shall be made to the Board of Appeals established by the Arkansas Energy Office, and a decision on an appeal will be made within 45 days of its filing.

108.2 Local Government: In any county or municipality where this Code is adopted, the governing body shall establish a Board of Appeals to adjudicate complaints arising from the application of the Code. When a Board of Appeals is established, the governing body shall prescribe procedures for providing a fair and reasonable hearing of the appeal.

* Add Section 109 VALIDITY as follows:

SECTION 109
VALIDITY

109.1 General. If a section, subsection, sentence, clause or phrase of this code is, for any reason, held to be unconstitutional, such decision shall not affect the validity of the remaining portions of this code.

* Add Section 110 RESPONSIBILITY as follows:

SECTION 110
RESPONSIBILITY

110.1 These minimum standards shall not be construed as relieving the licensed builder or contractor of his or her responsibility for compliance with local ordinances, codes, and regulations.

* Add Section 111 REFERENCED STANDARDS as follows:

SECTION 111
REFERENCED STANDARDS

111.1 General. The standards, and portions thereof, which are referred to in this code and listed in Chapter 10, shall be considered part of the requirements of this code to the extent of such reference.

111.2 Conflicting requirements. When a section of this code and a section of a referenced standard from Chapter 10 specify different materials, methods of construction or other requirements, the provisions of this code shall apply.

* Add Section 112 EFFECTIVE DATE as follows:

SECTION 112
EFFECTIVE DATE

112.1 The effective date of this Code for residential buildings, as defined herein, is 10/1/2004. The effective date of this Code for commercial buildings, as defined herein, is 10/1/2004.

CHAPTER 2
DEFINITIONS

* Revise Section 202 GENERAL DEFINITIONS to read as follows:

EFFICIENCY, HVAC SYSTEM. The ratio of useful energy output (at the point of use) to the energy input in consistent units for a designated time period, expressed in percent.

RECOOLING. The removal of heat by sensible cooling of the supply air (directly or indirectly) which has been previously heated above the temperature to which the air is to be supplied to the conditioned space for proper control of the temperature of that space.

RECOVERED ENERGY. Energy utilized which would otherwise be wasted (i.e., not contribute to a desired end use) from an energy utilization system.

RESET. Adjustment of the set point of a control instrument to a higher or lower value automatically or manually to conserve energy.

RESIDENTIAL BUILDING. Detached one- and two-family dwellings.

CHAPTER 3
DESIGN CONDITIONS

TABLE 302.1
EXTERIOR DESIGN CONDITIONS

* Revise two footnotes under table 302.1 as follows:

b. The degree days heating (base 65°F) and cooling (base 65°F) shall be selected from NOAA "Annual Degree Days to Selected Bases Derived from the 1961-1990 Normals," the ASHRAE *Handbook of Fundamentals*, data available from adjacent military installations, or other source of local weather data acceptable to the code official.
c. The climate zone shall be selected from the map provided in Figure 302.1(1) on the following page.
d. ACCA Manual J for residential, and ACCA Manual N for commercial.

* Add the following FIGURE 302.1(1) showing the four climate zones in Arkansas with a list of counties and their associated climate zones, and add Table 302.2 Arkansas HDD and zones:

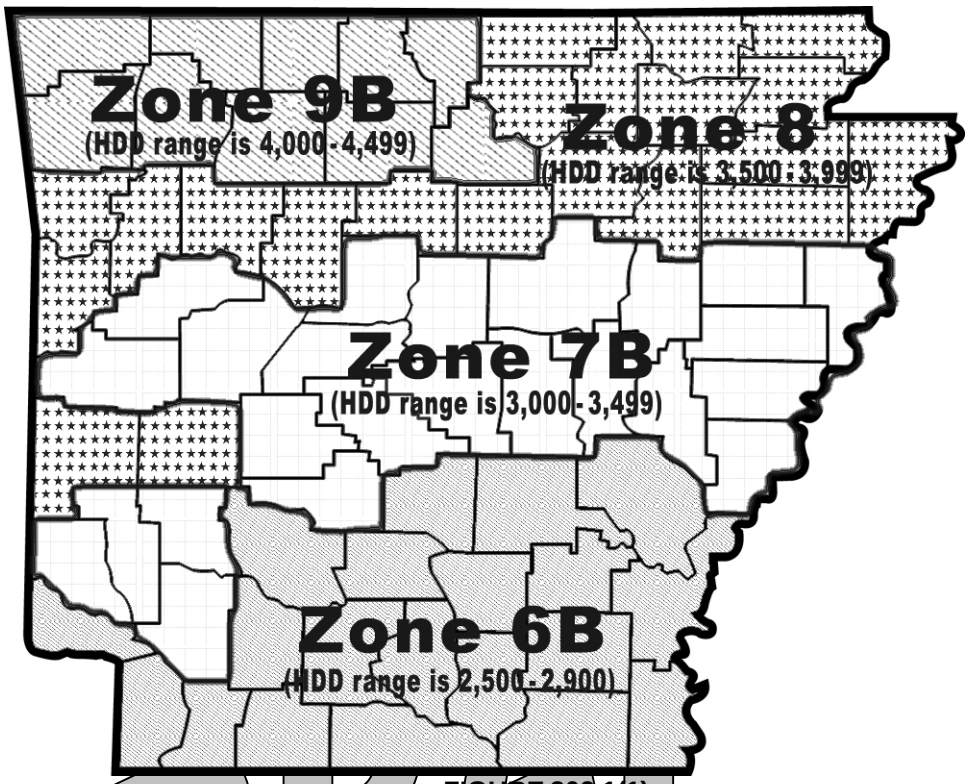

FIGURE 302.1(1)
ARKANSAS

Zone	County
6B	Arkansas (H)
6B	Ashley (H)
9B	Baxter
9B	Benton
9B	Boone
6B	Bradley (H)
6B	Calhoun (H)
9B	Carroll
6B	Chicot (H)
6B	Clark (H)
8	Clay
8	Cleburne
6B	Cleveland (H)
6B	Columbia (H)
7B	Conway (H)
8	Craighead
8	Crawford
7B	Crittenden (H)
7B	Cross (H)
6B	Dallas (H)
6B	Desha (H)
6B	Drew (H)
7B	Faulkner (H)
8	Franklin
8	Fulton
7B	Garland (H)
6B	Grant (H)
8	Greene
7B	Hempstead (H)
7B	Hot Spring (H)
7B	Howard (H)
8	Independence
8	Izard
8	Jackson
6B	Jefferson (H)
8	Johnson
6B	Lafayette (H)

Zone	County
8	Lawrence
7B	Lee (H)
6B	Lincoln (H)
6B	Little River (H)
7B	Logan (H)
7B	Lonoke (H)
9B	Madison
9B	Marion
6B	Miller (H)
8	Mississippi
7B	Monroe (H)
8	Montgomery
6B	Nevada (H)
9B	Newton
6B	Ouachita (H)
7B	Perry (H)
7B	Phillips (H)
7B	Pike (H)
8	Poinsett
8	Polk
8	Pope
7B	Prairie (H)
7B	Pulaski (H)
8	Randolph
7B	Saline (H)
7B	Scott (H)
9B	Searcy
8	Sebastian
7B	Sevier (H)
8	Sharp
7B	St Francis (H)
9B	Stone
6B	Union (H)
8	Van Buren
9B	Washington
7B	White (H)
7B	Woodruff (H)
7B	Yell (H)

Table 302.2 Arkansas HDD* and zones

Zone	HDD
6B	2,500 – 2,999
7B	3,000 – 3,499
8	3,500 – 3,999
9B	4,000 – 4,499

* HDD = Heating Degree Days

Note: Counties identified with (H) shall be considered “hot and humid climate areas” for purposes of the application of Section 502.1.1.

CHAPTER 4
RESIDENTIAL BUILDING DESIGN BY SYSTEMS ANALYSIS AND DESIGN OF BUILDINGS UTILIZING RENEWABLE ENERGY SOURCES

* Delete Section 402.2.3.1.3 FENESTRATION SYSTEM SOLAR HEAT GAIN COEFFICIENT, STANDARD DESIGN without substitution.

CHAPTER 5
RESIDENTIAL BUILDING DESIGN BY COMPONENT PERFORMANCE APPROACH

* Revise Exception 2 in Section 502.1.1 MOISTURE CONTROL as follows:

2. Vapor retarders shall not be required where the county in which the building is being constructed is considered a hot and humid climate area and identified as such in Figure 302.1(1).

* Delete Section 502.1.5 FENESTRATION SOLAR HEAT GAIN COEFFICIENT without substitution.

* Revise Table 503.3.3.3 MINIMUM DUCT INSULATION as follows:

TABLE 503.3.3.3
MINIMUM DUCT INSULATION [a]

ANNUAL HEATING DEGREE DAYS	Insulation *R*-value [d]			
	Ducts in unconditioned attics or outside building		Ducts in unconditioned basements, crawl spaces, garages, and other unconditioned spaces [c]	
	Supply	Return	Supply	Return
< 1,500	8	4	4	0
1,500 to 3,500	5.6	5.6	5.6	5.6
3,501 to 7,500	5.6	5.6	5.6	5.6
> 7,500	11	6	11	2

* Delete footnote b in Table 503.3.3.3 without substitution.

SECTION 503
BUILDING MECHANICAL SYSTEMS AND EQUIPMENT

* Replace the *International Mechanical Code* with the *Arkansas Mechanical Code* in Sections 503.3.3.4 DUCT CONSTRUCTION, 503.3.3.4.1 HIGH-AND MEDIUM-PRESSURE DUCT SYSTEMS and 503.3.3.4.2 LOW-PRESSURE DUCT SYSTEMS.

CHAPTER 6
SIMPLIFIED PRESCRIPTIVE REQUIREMENTS FOR DETACHED ONE- AND TWO-FAMILY DWELLINGS AND GROUP R-2, R-4 OR TOWNHOUSE RESIDENTIAL BUILDINGS

* Revise Section 601.2 COMPLIANCE to include deemed to comply tools that are approved by the Arkansas Energy Office.

601.2 Compliance. Compliance shall be demonstrated in accordance with Section 601.2.1 or 601.2.2. Deemed to comply tools that are approved by the Arkansas Energy Office shall be permitted to demonstrate compliance.

* Revise Section 601.3.2.1 DEFAULT FENESTRATION PERFORMANCE as follows:

601.3.2.1 Default fenestration performance. Where a manufacturer has not determined a fenestration product's *U*-factor in accordance with NFRC 100, compliance shall be determined by assigning such products a default *U*-factor from Tables 102.5.2(1) and 102.5.2(2).

* Modify Exception in Section 602.1.6 SLAB-ON-GRADE FLOORS as follows:

Exception**: Slab perimeter insulation is not required for unheated slabs in areas of moderate to very heavy termite infestation probability as shown in Figure 502.2(7). Where this exception is used, building envelope compliance shall be demonstrated by using Section 502.2.2 or Chapter 4 with the actual "Slab perimeter *R*-value and depth" in Table 602.1, or by using Section 502.2.4.**

* Delete Section 602.2 MAXIMUM SOLAR HEAT GAIN COEFFICIENT FOR FENESTRATION PRODUCTS without substitution.

CHAPTER 7
BUILDING DESIGN FOR ALL COMMERCIAL BUILDINGS

* Revise ASHRAE/IESNA 90.1 to ANSI/ASHRAE/IESNA 90.1-2001 in the following section:

701.1 Scope. Commercial buildings shall meet the requirements of ANSI/ASHRAE/IESNA 90.1-2001.

CHAPTER 8
DESIGN BY ACCEPTABLE PRACTICE FOR COMMERCIAL BUILDINGS

* Replace the *International Mechanical Code* with the *Arkansas Mechanical Code* in Sections 803.2.5 VENTILATION, 803.2.6 COOLING WITH OUTDOOR AIR, 803.2.8.1 DUCT CONSTRUCTION, 803.2.8.1.1 HIGH- AND MEDIUM-PRESSURE DUCT SYSTEMS, 803.2.8.1.2 LOW-PRESSURE DUCT SYSTEMS, 803.3.4 REQUIREMENTS FOR COMPLEX MECHANICAL SYSTEMS SERVING MULTIPLE ZONES, and 803.3.8.1 AIR SYSTEM BALANCING.

***** Replace ASHRAE/IESNA 90.1 with ANSI/ASHRAE/IESNA 90.1-2001 in Sections 801.2 APPLICATIONS, SECTION 802 BUILDING ENVELOPE REQUIREMENTS, 802.1 GENERAL, and 802.2 CRITERIA.

CHAPTER 10
REFERENCED STANDARDS

* Revise Chapter 10 REFERENCED STANDARDS to include the following:

AFC

Arkansas Fire Prevention Code
State Fire Marshal's Office
#1 State Police Plaza Dr
Little Rock, AR 72209
(501) 618-8624
Fax (501) 618-8621

Standard Reference Number	Title	Referenced in Code Section Number
AFC	.....	104.3

AMC

Arkansas Mechanical Code
Department of Health
Division of Protective Health Codes
4815 West Markham Street, Slot 24
Little Rock, AR 72205-3867
(501) 661-2642
Fax (501) 661-2671
http://www.healthyarkansas.com/phc/

Standard Reference Number	Title	Referenced in Code Section Number
AMC	.....	503.3.3.4, 503.3.3.4.1, 503.3.3.4.2, 803.2.5, 803.2.6, 803.2.8.1, 803.2.8.1.1, 803.2.8.1.2, 803.3.4, 803.3.8.1